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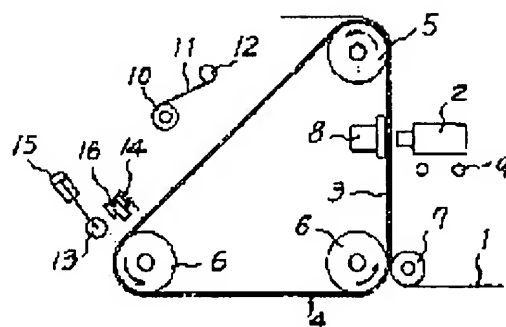
## (54) PRINTING METHOD AND APPARATUS THEREFOR

### (57)Abstract:

**PURPOSE:** To easily obtain a high-quality printed product in high operating efficiency in such a way that a double-side adhesive sheet is stuck to a revolving hard-to-deform metallic endless belt, a fabric to be printed is stuck to the sheet, and the fabric is subjected to e.g. ink jet printing during the circulatory movement of the endless belt intermittently.

**CONSTITUTION:** A double-side adhesive sheet 4 is stuck, to a metallic endless belt 3 revolved by a driving roller 5 using a relevant roller 13 and a driven roller 6 and a fabric 1 to be printed is stuck to the sheet 4 using a relevant roller 7. Subsequently, during the circulatory movement of the endless belt 3 intermittently, ink is intermittently jetted from e.g. an ink nozzle head 2

placed against the fabric 1 on the belt to provide a printed pattern on the fabric. The adhesive sheet 4 can be easily replaced by a new one using a roll 10, winding roll 12 and sticking roll 13 when the sheet is deteriorated. This method needs no resticking by dissolving and removing the adhesive with an organic solvent, thus is good in sanitarness and easy in



operations and the operating efficiency can be improved.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the textile-printing approach and equipment which print it printed objects, such as a textile and an imprint sheet.

[0002]

[Description of the Prior Art] For example, in ink jet textile-printing equipment, printed objects, such as a textile and an imprint sheet, are stuck on a metal endless belt, and it is requested that the intermittent feed of the textile-printing object is carried out with a metal endless belt. With ink jet textile-printing equipment, for every intermittent feed of the, the every intermittent feed of the printed object is carried out only, and a nozzle head runs crosswise [ of a printed object ], and ink is emitted from a nozzle head and injected by the printed object. This is repeated by turns successively and textile printing is performed to a printed object. Therefore, in order to print exactly, it is necessary to carry out the intermittent feed of the printed object with high precision, and it is not the endless belt made of rubber which is easy to deform, and it is necessary to carry out the intermittent feed of the printed object with a metal endless belt.

[0003] In relation to this, resin is melted by the organic solvent before this application application, and applying the solution to a metal endless belt is proposed. (Japanese Patent Application No. No. 88545 [ three to ] ). After spreading of the organic solvent solution of resin, if this is dried, adhesiveness can be given to a metal endless belt, a printed object can be stuck on a metal endless belt, and the intermittent feed of the printed object can be carried out with a metal endless belt. In this case, it can also be coped with although the adhesion of the resin of a belt deteriorates in connection with operating frequency and the passage of time. First, the resin of a belt is melted by the organic solvent and it is failed to write it with a doctor plate. Then, what is necessary is just to apply the organic solvent solution of resin again.

[0004]

[Problem(s) to be Solved by the Invention] however, the time of failing to write the resin of a belt and applying an organic solvent solution again -- the -- it writes, and it is necessary to use an organic solvent, respectively, and there is an insurance and sanitary problem in a dropping activity and spreading. Furthermore, it is failed manually to write resin, an organic solvent solution must be applied manually, time amount and an effort are required, maintenance cost goes up, and there is also a problem that a machine utilization rate falls. An organic solvent solution is applied to homogeneity and there is also a problem that it is difficult to keep the spreading extent constant, and dispersion arises in the playback condition of a metal endless belt.

[0005] Therefore, in sticking printed objects, such as a textile and an imprint sheet, on a metal endless belt, carrying out the intermittent feed of the printed object with a metal endless belt, and printing it a printed object, said conventional problem is solved, it is safe, and is sanitary, maintenance cost falls, and the machine utilization rate of this invention improves, and it is made for the purpose of making it dispersion not arise in the playback condition of a metal endless belt.

[0006]

[Means for Solving the Problem] According to this invention, a double-sided adhesion sheet is stuck on a metal endless belt, and a printed object is stuck on a double-sided adhesion sheet.

[0007] Moreover, according to this invention, a continuation double-sided adhesion sheet is supplied from that source of supply, and is led to a metal endless belt. Furthermore, a roller with tension is pushed against the continuation double-sided adhesion sheet on a belt, a continuation double-sided adhesion sheet is stuck on a belt with the drive of a belt, and a continuation double-sided adhesion sheet is cut by the cutter between a source of supply and a roller with tension after attachment of a continuation double-sided adhesion sheet.

[0008]

[Example] Hereafter, the example of this invention is explained.

[0009] In drawing 1, this is textile-printing equipment which prints the printed objects 1, such as a textile and an imprint sheet, and it is the thing of an ink jet type, it has the ink nozzle head 2, and the ink nozzle head 2 is arranged so that the metal endless belt 3 may be countered. And a double-sided adhesion sheet is stuck on the metal endless belt 3. In this example, the double-sided adhesive film 4 is used as a double-sided adhesion sheet, and this is stuck on the belt 3. The double-sided adhesive film 4 consists of a PET (polyethylene terephthalate) film and an adhesives layer. A PET film is a thing with a thickness of 50 micrometers, corona treatment of the front face by the side of the belt 3 is carried out, and sand mat processing of the front face of the opposite side is carried out. And the adhesives layer is formed in both sides of a PET film. An adhesives layer is the thing of acrylic or a silicon system.

[0010] Furthermore, with a driving roller 5, a belt 3 drives, the follower roller 6 rotates according to it, the printed object 1 is led to a belt 3, and the roller 7 with tension is pushed against the printed object 1 on a belt 3. Therefore, the printed object 1 can be stuck on the double-sided adhesive film 4, the printed object 1 can be stuck on the metal endless belt 3, and the intermittent feed of the printed object 1 can be carried out with the metal endless belt 3. The every intermittent feed of the printed object 1 is carried out only, and it is led to the nozzle head 2 and a platen 8. Furthermore, for every intermittent feed of the printed object 1, the nozzle head 2 moves along with a rail for movable rack 9, and it runs crosswise [ of the printed object 1 ], and ink is emitted from the nozzle head 2 and injected by the printed object 1. This is repeated by turns successively and textile printing is performed to the printed object 1.

[0011] Moreover, this equipment has the source of supply of the continuation double-sided adhesive film 4. A source of supply consists of a roll 10 which rolled round the continuation double-sided adhesive film 4, a release paper 11 is stuck on one side of the continuation double-sided adhesive film 4, this is rolled round by the roll 10, and the release paper 11 is led to the take-up reel 12. Furthermore, it is arranged so that the roller 13 with tension may counter a belt 3, and the cutter 14 is formed between the roll 10 and the roller 13 with tension. The roller 13 with tension is for pushing against the continuation double-sided adhesive film 4 on a belt 3, and is connected with the cylinder 15. A cutter 14 is for cutting the continuation double-sided adhesive film 4, it is the rotary cutter of manual system, and it is supported by the guide rail 16 and a guide rail 16 is extended crosswise [ of the continuation double-sided adhesive film 4 ]. Therefore, a cutter 14 can be moved along with a guide rail 16, and it can be made to run crosswise [ of the continuation double-sided adhesive film 4 ].

[0012] Therefore, when the adhesion of the double-sided adhesive film 4 of a belt 3 deteriorates, it can be re-covered easily. In order to re-cover the double-sided adhesive film 4, first, the roller 7 with tension is retreated from a belt 3, the double-sided adhesive film 4 is torn off from a belt 3, and as shown in drawing 2, the continuation double-sided adhesive film 4 is pulled out and supplied from a roll 10. Furthermore, a release paper 11 is torn off from the continuation double-sided adhesive film 4, and it rolls round to a take-up reel 12, and the continuation double-sided adhesive film 4 is led to a belt 3, and is stuck. Subsequently, as shown in drawing 3, in a cylinder 15, the roller 13 with tension is operated and this is forced on the continuation double-sided adhesive film 4 on a belt 3. As for the location, it is desirable that it is the location of several cm from the start edge of the continuation double-sided adhesive film 4.

[0013] Then, if a belt 3 is driven with a driving roller 5 as shown in drawing 4, the roller 13 with tension acts on the continuation double-sided adhesive film 4, and the continuation double-sided

adhesive film 4 which does not have a basis in the drive of a belt 3 will be pulled out from a roll 10, and will be stuck on a belt 3. Moreover, braking torque is applied to a roll 10, tension is given to the continuation double-sided adhesive film 4, and the continuation double-sided adhesive film 4 is pulled out with tension. Therefore, the continuation double-sided adhesive film 4 can be stuck exactly. Then, as shown in drawing 5, when the start edge of the continuation double-sided adhesive film 4 arrives at the location of a cutter 14, a belt 3 stops. About the amount of drives of the belt 3 until it stops, it is programmed beforehand, and a belt 3 stops automatically. The halt location precision is several micrometers.

[0014] Therefore, if it is made to run crosswise [ of the continuation double-sided adhesive film 4 ] a cutter 14 as shown in drawing 6 after that, in the start edge of the continuation double-sided adhesive film 4, and a corresponding location, the continuation double-sided adhesive film 4 will be cut by the cutter 14. Then, if a belt 3 is driven again, the roller 13 with tension will act on the double-sided adhesive film 4, and the double-sided adhesive film 4 will be stuck to the termination. Therefore, on a belt 3, the start edge can be made to be able to adjust the termination of the double-sided adhesive film 4, and this can be stuck exactly.

[0015] The double-sided adhesive film 4 can be re-covered by this. Therefore, as shown in drawing 7 after that, the roller 13 with tension is retreated from a belt 3 and the double-sided adhesive film 4. Furthermore, the cut double-sided adhesive film 4 is rolled round on a roll 10. Then, if the printed object 1 is led to the metal endless belt 3, the printed object 1 can be stuck on the double-sided adhesive film 4, the printed object 1 can be stuck on the metal endless belt 3, and the intermittent feed of the printed object 1 can be carried out with the metal endless belt 3.

[0016] Therefore, even if the adhesion of the double-sided adhesive film 4 of a belt 3 deteriorates, it is not necessary to melt resin by the organic solvent, is [ that what is necessary is just to re-cover the double-sided adhesive film 4 ] safe like said before, and sanitary. The activity is easy and time amount and an effort are not required. Therefore, maintenance cost can be reduced and a machine utilization rate can be raised. Dispersion does not arise in the playback condition of the metal endless belt 3.

[0017] Drawing 8 shows other examples. In this example, the auxiliary rollers 17 and 18 of a pair are formed between the roll 10 and the roller 13 with tension, and it is tacking carried out of the start edge of the continuation double-sided adhesive film 4 to one auxiliary roller 17. Furthermore, in the both ends of each auxiliary rollers 17 and 18, a link 19 is formed, respectively, and each auxiliary rollers 17 and 18 are supported by the link 19, and the link 19 is supported by the pin 21 of an arm 20, and can rock the surroundings of a pin 20. An arm 20 can rock the surroundings of a roll 10 and is connected with the cylinder 22.

[0018] And when the continuation double-sided adhesive film 4 is stuck on a belt 3, as shown in drawing 9, first, in a cylinder 22, an arm 20 is operated, it rocks, and the auxiliary rollers 17 and 18 move toward a belt 3, and the continuation double-sided adhesive film 4 is pushed against a belt 3, and is stuck. Then, a belt 3 drives with a driving roller 5. Therefore, the auxiliary rollers 17 and 18 act on the continuation double-sided adhesive film 4, and with the drive of a belt 3, the continuation double-sided adhesive film 4 is pulled out from a roll 10, and is stuck on a belt 3. Then, as shown in drawing 10, the roller 13 with tension is pushed against the continuation double-sided adhesive film 4 on a belt 3, and the auxiliary rollers 17 and 18 retreat from a belt 3 and the continuation double-sided adhesive film 4. Therefore, like the equipment of drawing 1, the roller 13 with tension acts on the continuation double-sided adhesive film 4, and the continuation double-sided adhesive film 4 is pulled out by this, and it is stuck.

[0019] Then, as shown in drawing 11; when the start edge of the continuation double-sided adhesive film 4 arrives at the location of a cutter 14 between each auxiliary roller 17 and 18, a belt 3 stops. Furthermore, as shown in drawing 12, the auxiliary rollers 17 and 18 move toward a belt 3, and it engages with the continuation double-sided adhesive film 4. Therefore, the tension of the continuation double-sided adhesive film 4 acts to the auxiliary roller 17 and a link 19 between the auxiliary roller 18 and a roll 10, and a link 19 rocks the surroundings of a pin 21. Moreover, although the amount of drives of a cylinder 22 is selected beforehand and the auxiliary roller 18 moves even a belt 3, the auxiliary

roller 17 does not reach a belt 3. Therefore, although the continuation double-sided adhesive film 4 contacts a belt 3 in the location of the auxiliary roller 18, between each auxiliary roller 17 and 18, the continuation double-sided adhesive film 4 is maintained at the condition of having separated from the belt 3.

[0020] Then, as shown in drawing 13, a cutter 14 runs crosswise [ of the continuation double-sided adhesive film 4 ] between each auxiliary roller 17 and 18, and the continuation double-sided adhesive film 4 is cut by the cutter 14. Therefore, it is tacking carried out of the start edge of the continuation double-sided adhesive film 4 to one auxiliary roller 17. Moreover, it can come, simultaneously the auxiliary roller 18 of another side acts on the double-sided adhesive film 4 on a belt 3, and it is forced and tacking carried out of the termination of the double-sided adhesive film 4 to a belt 3. Therefore, the termination of the double-sided adhesive film 4 does not curl. Then, a belt 3 drives again, the roller 13 with tension acts on the double-sided adhesive film 4, and the double-sided adhesive film 4 is stuck to the termination. Then, the auxiliary rollers 17 and 18 and the roller 13 with tension retreat and stand by in the location of a basis.

[0021] In addition, although this example explained what used the PET film for the double-sided adhesive film 4, that need does not necessarily exist. It may replace with a PET film, other synthetic-resin films may be used, and an adhesives layer may be formed in the both sides. The quality of the material of an adhesives layer is also arbitrary. As long as it has an adhesive property over the printed object 1 and the metal endless belt 3, an adhesives layer may be formed with what kind of adhesives.

[0022] Moreover, if an adhesives layer is formed in both sides of a synthetic-resin film and pore is formed in a synthetic-resin film and an adhesives layer, when sticking the double-sided adhesive film 4 on the metal endless belt 3, air is missed from between both, irregularity can be prevented from being generated on the front face, and it is desirable. For example, in both sides of a polyethylene terephthalate resin film (200 micrometers in thickness, and eyes 105 g/m<sup>2</sup>), the adhesives solution which consists of lacquer thinner [the Toyo Ink make] of acrylic resin RIKITAKKU[ of 70 weight sections ] K [Product made from the Large Force] and 30 weight sections is coated with a reverse coating machine, and it is 100 micrometers, 100 pieces/m<sup>2</sup> by the card clothing roll after the desiccation. Pore is formed. Then, 2kg/cm<sup>2</sup> When stuck on the metal endless belt 3 with roll pressure, irregularity did not arise on the front face, and irregularity did not arise on the front face of the printed object 1 stuck on it, but textile printing was performed to homogeneity, and the high textile-printing product of quality was obtained by this.

[0023] It may replace with the double-sided adhesive film 4, and other double-sided adhesion sheets may be used. For example, using what consists of a nonwoven fabric and a fine porosity adhesive property coat as a double-sided adhesion sheet is also considered. In this case, that nonwoven fabric requires that the SMD value by the KES method should be 10 microns or less. A KES method is KAWABATA. EVALUATION It is the abbreviated name of SYSTEM and is the appraisal method of Professor Kyoto University Kawabata design. The SMD value by the KES method is computed by the following formula.

[0024]

[Equation 1]

$$SMD = \frac{1}{X} \int_0^x |T - T_a| dx$$

[0025] However, T : Thickness of the sample in a location x (thickness measured by contact)

The average of T<sub>a</sub>:T [0026] When an SMD value is 10 microns or less, the front face of a nonwoven fabric is smooth and irregularity is not produced. Therefore, the organic solvent solution of a synthetic polymer can be applied to the both sides, this can be immersed into coagulation liquid, a fine porosity adhesive property coat can be formed with the synthetic polymer, and a desirable double-sided adhesion sheet can be obtained by this.

[0027] In addition, a nonwoven fabric may be what kind of thing. As long as the same is said of a synthetic polymer, it can dissolve in an organic solvent and it can form a fine porosity adhesive property

coat by the wet coagulation method, a synthetic polymer may also be what kind of thing. Synthetic polymers, such as polyurethane, polyamide resin, vinylchloride resin, acrylic resin, acrylonitrile-butadiene system rubber (SBR), and styrene-butadiene system rubber (SBR), correspond to it. It is the coagulation liquid which can be used for coagulation liquid, such as mixture of water, and dimethylformamide and water, and a water solution of mineral salt (salt, a salt cake, ammonium sulfate).

[0028] For example, a rayon fiber is cut into the length of about 50mm, a web is formed with a card, needle punch is given to the web, and a three-dimensions interlaced nonwoven fabric (1mm in thickness, eyes 300 g/cm<sup>2</sup>, SMD value of 4 microns by KES-FB series) is manufactured by this. Furthermore, the resin solution which consists of dimethylformamide of acrylic resin RIKITAKKU [of 50 weight sections] K [Product made from the Large Force], acrylic resin XE-3773A [the product made from Neagari Chemistry] of 20 weight sections, and 30 weight sections is coated with a reverse roll coater, it is immersed underwater and it is made to solidify this in the both sides. And after washing and desiccation, when the double-sided adhesion sheet was stuck on the metal endless belt 3, irregularity did not arise on the front face, and irregularity did not arise on the front face of the printed object 1 stuck on it, but textile printing was performed to homogeneity, and the high textile-printing product of quality was obtained by this.

[0029]

[Effect of the Invention] As explained above, according to this invention, a double-sided adhesion sheet is stuck on the metal endless belt 3, and the printed object 1 is stuck on a double-sided adhesion sheet. Therefore, the printed object 1 can be stuck on the metal endless belt 3, and the intermittent feed of the printed object 1 can be carried out with the metal endless belt 3. Moreover, even if the adhesion of the double-sided adhesion sheet of a belt 3 deteriorates, it is not necessary to melt resin by the organic solvent, is [that what is necessary is just to re-cover the double-sided adhesion sheet] safe like said before, and sanitary. The activity is easy and time amount and an effort are not required. Therefore, maintenance cost can be reduced and a machine utilization rate can be raised. Dispersion does not arise in the playback condition of the metal endless belt 3.

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CLAIMS

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[Claim(s)]

[Claim 1] The textile-printing approach characterized by sticking printed objects, such as a textile and an imprint sheet, on a metal endless belt, carrying out the intermittent feed of said printed object, sticking a double-sided adhesion sheet on said belt in the textile-printing approach of printing it said printed object, and sticking said printed object on said double-sided adhesion sheet with said belt.

[Claim 2] Said double-sided adhesion sheet is an approach according to claim 1 characterized by consisting of a synthetic-resin film and an adhesives layer, forming said adhesives layer in both sides of said synthetic-resin film, and forming pore in said synthetic-resin film and said adhesives layer.

[Claim 3] Said double-sided adhesion sheet is an approach characterized by consisting of a nonwoven fabric and a fine porosity adhesive property coat, for the SMD value by the KES method being 10 microns or less, and for said nonwoven fabric applying the organic solvent solution of a synthetic polymer to the both sides, immersing it into coagulation liquid in this, and forming said fine porosity adhesive property coat with said synthetic polymer.

[Claim 4] In the equipment which sticks printed objects, such as a textile and an imprint sheet, on a metal endless belt, carries out the intermittent feed of said printed object with said belt, and was made to print it said printed object The source of supply which supplies a continuation double-sided adhesion sheet to said belt, and the roller with tension which is pushed against said continuation double-sided adhesion sheet on said belt, and sticks said continuation double-sided adhesion sheet on said belt with the drive of said belt, Textile-printing equipment characterized by having said source of supply and the cutter which cuts said continuation double-sided adhesion sheet between said rollers with tension after attachment of said continuation double-sided adhesion sheet.

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[Translation done.]